1. A polymerizable dental composition, comprising:

(a) at least one degradable macromonomer having one or more terminal acrylate or methacrylate groups;

(b) a curing composition;

(c) a filler composition comprising bioactive particles of bioactive glass, bioactive glass-ceramics, bioactive calcium phosphates, bioactive calcium apatites, or mixtures thereof; and

(d) optionally one or more co-polymerizable acrylate or methacrylate monomers.

2. The composition of claim 1, wherein the degradable macromonomer having terminal acrylate or methacrylate groups is the reaction product of lactide, glycolide, caprolactone, or a mixture thereof in the presence of a compound having at least one active hydrogen and at least one acrylate or methacrylate functionality.

3. The composition of claim 2, wherein the active hydrogen is a hydroxyl hydrogen.

4. The composition of claim 2, wherein the compound is selected from the group

consisting of hydroxyalkyl acrylates and methacrylates wherein the alkyl group has from 1 to 12 carbons, and mixtures comprising at least one of the foregoing.

5. The composition of claim 4, wherein the compound is selected from the group consisting of 2-hydroxyethyl methacrylate, 2-hydroxyethyl acrylate, diethylene glycol monomethacrylate, diethylene glycol monoacrylate, hydroxypropyl methacrylate, hydroxypropyl acrylate, tetraethyleneglycol monomethacrylate, tetraethyleneglycol monoacrylate, pentaethyleneglycol methacrylate, hydroxypolyethyl methacrylate, pentaethyleneglycol monoacrylate, dipropyleneglycol monomethacrylate, dipropyleneglycol monoacrylate, phenoxyhydroxyphenyl methacrylate, and mixtures comprising at least one of the foregoing.

6. The composition of claim 5, wherein the compound is 2-hydroxyethyl methacrylate.

7. The composition of claim 1, wherein the degradable macromonomer having terminal acrylate or methacrylate groups is 2-(caprolactone)ethyl methacrylate.

8. The composition of claim 1, wherein the co-polymerizable acrylate or methacrylate monomer is present in amounts in a range from about 0 % to 95% by weight of

the total composition.

9. The composition of claim 8, wherein the co-polymerizable acrylate or methacrylate monomer is a diluent monomer present in an amount effective to provide delivery to a restoration site using an applicator.

10. The composition of claim 9, wherein the diluent monomer is selected from the group consisting of liquid dimethacrylate, trimethacrylate, glycerol dimethacrylate, ethylene glycol dimethacrylate, tri(ethylene glycol) dimethacrylate, tetra(methylene glycol) dimethacrylate, polyethylene glycol dimethacrylate, trimethylolpropane trimethacrylate, 1,6-hexanediol dimethacrylate, 2-hydroxyethyl acrylate, and 1,3-butanediol dimethacrylate.

11. The composition of claim 9, wherein the diluent monomer is used in combination with other monomers selected from the group consisting of viscous methacrylate-based monomers, non-hydroxylated resins, or alkylated hydroxyl-containing resins.

12. The composition of claim 11, wherein the other monomers consist of 2,2'-bis [4-(2-hydroxy-3-methacryloxypropoxy)phenyl] propane, urethane dimethacrylate, or ethoxylated bisphenol A dimethacrylate.

13. The composition of claim 1, wherein the curing composition is selected from the group consisting of light-activated polymerization initiators, heat-cure initiators, a self-curing two-part system, and combinations thereof.

14. The composition of claim 13, wherein the light-activated polymerization initiators are selected from the group consisting of benzil, benzoin, benzoin methyl ether, DL-camphorquinone, and benzil diketones.

15. The composition of claim 13, wherein the light-activated polymerization initiators are used in combination with cure accelerators.

16. The composition of claim 15, wherein the cure accelerators are tertiary amines.

17. The composition of claim 13, wherein the heat-cure initiators are free radical initiators.

18. The composition of claim 13, wherein the heat-cure initiators are selected from the group consisting of benzoyl peroxide, lauroyl peroxide, dicumyl peroxide, and 1,1'-

azobis(cyclohexanecarbonitrile).

19. The composition of claim 13, wherein the heat-cure initiators are activated by the heat of reaction generated by the light-activated polymerization process.

20. The composition of claim 19, pre-mixed as a single-component mixture and optionally supplied in syringes, compules, or cartridges.

21. The composition of claim 1, wherein the curing composition is a self-curing two-part system mixed prior to use comprising an initiator in one part and an accelerator in a second part whereby the two parts contain equal or various amounts of the degradable macromonomer and co-polymerizable acrylate or methacrylate monomer.

22. The composition of claim 1, wherein the filler composition further comprises non-bioactive particles comprising inorganic calcium compounds, calcium hydroxide, calcium oxide, poly(lactide), poly(glycolide), poly(lactide-*co*-glycolide), poly(methacrylate), silica, fumed silica, silicate glass, glass fibers, quartz, barium silicate, strontium silicate, barium borosilicate, strontium borosilicate, borosilicate, lithium silicate, amorphous silica, ammoniated or deammoniated calcium phosphate and alumina, zirconia, tin oxide, titania and combinations thereof.

23. The composition of claim 1, wherein the filler composition further comprises a material is selected from the group consisting of radiopaque material and high refractive index material.

24. The composition of claim 23, wherein the radiopaque material is selected from the group consisting of barium sulfate and bismuth subcarbonate.

25. The composition of claim 23, wherein the high refractive index material is selected from the group consisting of high refractive index silica glass fillers, bioceramics, apatites, hydroxyapatites, and modified hydroxyapatite compositions.

26. The composition of claim 1, optionally containing additives such as dyes, ultraviolet stabilizers, fluorescent whitening agents, anti-oxidants, and medicaments.

27. The composition of claim 1 wherein the bioactive glass comprises by weight percent about 40 to about 90 % SiO_2, about 4 to about 45 % CaO, 0 to about 10 % Na_2O, about 2 to about16 % P_2O_5, 0 to about 25 % CaF_2, 0 to about 4 % B_2O_3, 0 to about 8 % K_2O and 0 to about 5 % MgO.

28. The composition of claim 1 wherein the bioactive glass comprises about 45 weight % SiO_2, about 24.5 weight % Na_2O, about 24.5 weight % CaO and about 6 weight % P_2O_5.

29. A dental or medical restoration formed from the composition of claim 1.

30. A method of forming a dental or medical restoration comprising:

preparing a site to be restored in a tooth or bone; and

applying a composition comprising

(a) at least one degradable macromonomer having terminal acrylate or methacrylate groups;

(b) a curing composition;

(c) a filler composition comprising bioactive particles of bioactive glass, bioactive glass-ceramics, bioactive calcium phosphates, bioactive calcium apatites, or mixtures thereof; and

(d) optionally one or more co-polymerizable acrylate or methacrylate monomers; and

curing the compostions.

31. The method of claim 30, wherein the degradable macromonomer having terminal acrylate or methacrylate groups is the reaction product of lactide, glycolide, caprolactone, or a mixture thereof in the presence of a compound having at least one active hydrogen and at least one acrylate or methacrylate functionality.

32. The method of claim 31, wherein the active hydrogen is a hydroxyl hydrogen.

33. The method of claim 31, wherein the compound is selected from the group consisting of hydroxyalkyl acrylates and methacrylates wherein the alkyl group has from 1 to 12 carbons, and mixtures comprising at least one of the foregoing.

34. The method of claim 33, wherein the compound is selected from the group consisting of 2-hydroxyethyl methacrylate, 2-hydroxyethyl acrylate, diethylene glycol monomethacrylate, diethylene glycol monoacrylate, hydroxypropyl methacrylate, hydroxypropyl acrylate, tetraethyleneglycol monomethacrylate, tetraethyleneglycol monoacrylate, pentaethyleneglycol methacrylate, hydroxypolyethyl methacrylate, pentaethyleneglycol monoacrylate, dipropyleneglycol monomethacrylate, dipropyleneglycol monoacrylate, phenoxyhydroxyphenyl methacrylate, and mixtures comprising at least one of the foregoing.

35. The method of claim 30, wherein the degradable macromonomer having terminal acrylate or methacrylate groups is 2-(caprolactone)ethyl methacrylate.

36. The method of claim 30, wherein the co-polymerizable acrylate or methacrylate monomer is a diluent monomer present in an amount effective to provide delivery to the restoration site using an applicator.

37. The method of claim 36, wherein the diluent monomer is selected from the group consisting of liquid dimethacrylate, trimethacrylate, glycerol dimethacrylate, ethylene glycol dimethacrylate, tri(ethylene glycol) dimethacrylate, tetra(methylene glycol) dimethacrylate, polyethylene glycol dimethacrylate, trimethylolpropane trimethacrylate, 1,6-hexanediol dimethacrylate, 2-hydroxyethyl acrylate, and 1,3-butanediol dimethacrylate.

38. The method of claim 30, wherein the curing composition is selected from the group consisting of light-activated polymerization initiators, heat-cure initiators, a self-curing two-part system, and combinations thereof.

39. The method of claim 30, wherein the curing composition is a self-curing two-part system mixed prior to use comprising an initiator in one part and an accelerator in a second part whereby the two parts contain equal or various amounts of the degradable

macromonomer and co-polymerizable acrylate or methacrylate monomer.

40. The method of claim 30, wherein the filler composition further comprises non-bioactive particles comprising inorganic calcium compounds, calcium phosphates, calcium hydroxide, calcium oxide, tricalcium phosphate, poly(lactide), poly(glycolide), poly(lactide-*co*-glycolide), poly(methacrylate), silica, fumed silica, silicate glass, glass fibers, quartz, barium silicate, strontium silicate, barium borosilicate, strontium borosilicate, borosilicate, lithium silicate, amorphous silica, ammoniated or deammoniated calcium phosphate and alumina, zirconia, tin oxide, and titania and combinations thereof.